

NEW BIRD DESCRIPTIONS WITHOUT PROPER VOUCHER SPECIMENS: REFLECTIONS AFTER THE BUGUN LIOCICHLA CASE¹

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A new species of *Liocichla* (Aves: Timaliidae) was recently described (Athreya 2006) without the submission of a proper voucher specimen. The author did not collect one on grounds that the species may be rare. The publication evoked dismay among museum ornithologists who feel that the species should not have been formally described and published without a proper voucher specimen, and that the bird may not be as rare as believed. There is also a feeling outside of museum circles that the requirement of voucher specimens may be obsolete and that museum scientists are insensitive to conservation concerns. This essay analyses this controversy and attempts to present the science behind this sensitive issue, to facilitate future decision making. Topics covered include: similar cases in the past and the criticisms they have evoked; why voucher specimens are indispensable for ornithological research and conservation; why there may be no viable alternatives; how scientific collecting makes little or no impact in most bird populations; whether bird journals should accept new descriptions without proper voucher specimens; and how modern museum ornithologists are partners rather than adversaries in the cause of bird conservation.

Key words: New descriptions, voucher specimens, Museum collections, ICZN, Bugun Liocichla

INTRODUCTION

The recent description of the Bugun Liocichla *Liocichla bugunorum* (Athreya 2006) created a stir in the popular media world-wide, ostensibly because of the exquisitely pretty appearance of this bird. In the New World, most new bird descriptions make the cover of *Auk* or such journals, but not leading newspapers. But Athreya's paper also evoked frowns in the ornithological community, especially among the systematists who make their living studying avian diversity, describing new species, or dealing with taxonomic conundrums in ornithology, because this case represents one of the few instances in literature in which a new bird species was described *sans* a full museum specimen.

Athreya did not collect a specimen for fear that the species may be rare, and therefore resorted to describing the species primarily by using various photographs obtained from mist-netted birds. He satisfied the rules of the International Code of Zoological Nomenclature (ICZN) by obtaining and depositing feather samples. This case may have added fuel to the already widespread feeling that museum collections are no longer necessary for describing new species. Worse, in a country where bureaucratic hurdles for scientists are already formidable, the case may actually make getting scientific collecting permits tougher.

There also seems to be a general feeling in India (and elsewhere in the world) that museum scientists are zealously in pursuit of specimens, even at the expense of conservation. Some people, including some experienced birdwatchers, feel

that collections can jeopardize survival of species. More disturbing is the perceived transatlantic divide between conservationists and museum ornithologists. Having worked intensely on birds on both sides of the Atlantic, but not being a systematist myself, I decided to research this issue. I corresponded with leading avian systematists in the USA, and interviewed them personally. I read the extensive literature available on this topic. I also had this article reviewed by some of them (see Acknowledgements). This essay should hopefully yield better insights into the science behind the issue and dispel wrong notions that prevail.

First, I briefly present the cases in the past where new descriptions have been published in the absence of a specimen and the criticisms they have evoked. Then, I deal with the systematists' rationale for requiring specimens for new species descriptions and their arguments on why judicious bird collections make no significant inroads into bird populations. I then deal with the delicate questions of whether rare birds should be collected and if alternatives to collecting should be explored. I also tackle the mistaken notion that museum scientists are not conservationists, and briefly highlight how museum collections actually enhance research and conservation efforts in the long-term. Finally, I address the issue of whether bird journals should accept new descriptions without proper type specimens.

The precedents: new bird descriptions without proper voucher specimens

In at least four instances in the past, new birds have

been described using living specimens, of which I briefly describe below the two most recent. The other two (Collar 1999) are: Delacour and Jabouille's (1924) description of the Imperial Pheasant (*Lophura imperialis*); and Sclater's (1863) paper on *Galllicolumba bartletti* (= *G. criniger*).

A Malurine Wren, *Malurus campbelli* (Campbell's Fairy-Wren) was first described in 1983 from New Guinea, based solely on photographs of five mist-netted birds that were later released (Schodde and Weatherly 1983). Although they distributed "near life-size" prints to leading bird museums, the authors clearly violated ICZN rules which mandate "an animal, or part of an animal" to be collected and preserved in a museum as type material.

In August 1988, an unidentifiable bush-shrike was captured, photographed, video-filmed, and tape-recorded in central Somalia. The bird was apparently the only known individual of the species in the wild. Civil unrest forced the evacuation of the chief player(s) involved and the live bird was brought to Germany, where it was kept alive. The bird was then returned to Somalia in March 1990 (how it was transported internationally is unclear), but because the original area of capture was isolated by civil war, and because it "had hardly any suitable habitat left", it was not released back where originally captured, but instead was liberated far from the original place of capture on March 23, 1990, after more than a year in captivity. Smith *et al.* (1991) described it as a new species (Bulo Burti Boubou, *Laniarius liberatus*) based on DNA sequence data obtained from blood samples taken from the captive bird. The type material submitted included DNA and blood samples, plus some moulted feathers.

These two cases triggered a firestorm of criticism from systematists (LeCroy and Vuilleumier 1992; Peterson and Lanyon 1992; Banks *et al.* 1993; Winker 1996). The practice of neglecting the collection of proper voucher specimens was called 'sloppy science', and the practitioners were labeled 'misguided' (Winker 1996). Banks *et al.* (1993) even urged that "those who are unaware of or unwilling to abide by accepted principles and practices of systematics and taxonomy should excuse themselves from those aspects of ornithology." The rest of this essay addresses their chief concerns.

Why are Voucher Specimens needed for New Bird Descriptions?

This question is relevant considering the widespread feeling that bird collections are leftover of the past and that they are no longer needed. Banks *et al.* (1993), in their scathing rebuke of new descriptions without type specimens, vehemently stressed the importance of defining a 'name' and associating it with an available 'type'. Many collection

opponents think that specimens are too primitive a way to 'document the presence' of a species, and that any possible gain in knowledge is simply not worth the killing of a bird. These people generally do not appreciate the enduring value of specimens, or the minute impact collecting has on bird populations. In an excellent and highly detailed paper, Remsen (1995) made powerful arguments on the importance of continued collecting of bird specimens to bird studies and conservation. Collections are not merely done to document the presence of a bird, but rather to act as a permanent archive from which an enormous amount of information can be gleaned in the long-term (Parkes 1963; Remsen 1995). Inquiries based on careful examination of museum skins spawn many unexpected and unanticipated surprises long after the specimens themselves are added to the museum drawers, ranging from delineation of new species or even new genera, to documentation of phenotypic change in short timeframes, to comparison of toxin levels over time (Remsen 1995; Rocque and Winker 2005; Winker 2004; Winker 2005). Charles Darwin recognized different species of finches in his collection only after his return to England, and even today, his collections are used by biologists (Diamond 1987). Museum specimens are indispensable not only to delineate past and present ranges of species and identify biodiversity hotspots for protection, but also as basis for entire fields of scientific endeavour (Foster and Cannell 1990). Even modern techniques, such as stable isotope analysis, have relied on archived museum specimens (Rocque and Winker 2005).

Without a proper voucher specimen, the taxonomic status of the newly reported *Liocichla* will always be open to doubt. Townsend Peterson, an accomplished systematic ornithologist and conservationist, expressed concern that describing new species without proper voucher specimens could lead to serious problems in double-description of species and confusion with nomenclature. In numerous instances, new bird species have been recognized and described only by careful scrutiny of museum specimens of a wide spectrum of bird species, both the one described and its allied forms. Diamond (1987) mentioned a case from Australia in which five new species, which would never have been recognized as distinct species, were described based only by a comparison of a series of museum specimens. For more on the indispensable nature of voucher specimens, see the examples in Bates *et al.* (2004).

So, one may ask, if voucher specimens are that important, why isn't the ICZN revised to explicitly state that? I posed the same question to the systematists. Peterson felt that the problem may be in the fact that even 'full' voucher specimens are only part of the bird, and that the Code already states that a part of the bird has to be deposited. Richard

Banks said that the provision that part of an animal can be used covers mammals (skull only in many cases) and invertebrates too. In fact, Banks added, in some invertebrate groups, a specimen must be virtually destroyed during the identification process, leaving little or nothing for a type. The bottom-line: With so many exceptions and with such wide variation in minimally acceptable criteria for type specimens, the code is best left in general terms, to cover the entire range of zoological taxa.

Why are Photographs and Feather samples insufficient for New Bird Descriptions?

Although the photographs that accompanied the *Liocichla* descriptions appear sharp and apparently serve their purpose, in general, photographs are not always reliable because they may not reveal critical characters and colour shades may not be true (Remsen 1995). Aspects such as the angle, light availability, quality of the device or film used, and the photographer's skill can influence the product. The photograph may also change through time. More disturbingly, many photographs can easily be doctored leaving open the possibility of scientific fraud. Also, colour descriptions are considered most reliable when standard colour charts (Smithe 1975-1981) are used in the field, which was not done in the *Liocichla* description. Photographs are also deficient in that they yield just a fraction of the information that can be obtained from a type specimen (Goodman and Lanyon 1994).

There was a time in the early 20th century and before, when bird illustrations (paintings) were sometimes used as the basis for new descriptions. This was before the tradition of the preparation of specimens was established. The ICZN recognizes and accepts this aspect of the past, emphasizing that the type is the specimen illustrated and not the illustration itself. But illustrations cannot be used now. To modern museum ornithologists, photographs without a voucher specimen are akin to such illustrations and may signify a step backward to an outdated system. With modern preservation methods available now, there is no need to return to the decidedly weaker historic methods.

Feather samples deposited as voucher material would have limited (if any) value, other than satisfying ICZN rules. Non-destructive sampling of this kind does not yield the long-term scientific benefits of proper type specimens (Christidis 1995; Rocque and Winker 2005).

Does Modern Scientific Collecting Affect Bird Populations?

It is unclear whether or not scientific collecting played a role in the extinction of any bird species. In some cases, collecting along with deleterious practices, like logging, has contributed to demise of populations, for e.g. the Ivory-billed

Woodpecker *Campephilus principalis* (Jackson 2002). But modern scientific bird collecting makes little or no impact on most local bird populations. Remsen (1995) and Winker (1996) attributed anti-collection measures and the decline in numbers of museum specimens to a mistaken focus on conservation at the level of the individual rather than the population. Whatever little impact is generated by collecting has little import in the long-term because bird populations have generally shown to be very resilient (Lack 1954). Remsen (1995) provided some compelling figures: A typical common passerine of tropical forest undergrowth occurs at a density of one pair per five hectares, which translates to 20 pairs per sq. km. If proper habitat is available, a miniscule 10 x 10 km area can have 2,000 pairs of the species, which is "far more individuals than exist in all world's collections combined for most tropical bird species after more than 150 years of scientific collecting" (Remsen 1995). Collecting of birds for scientific and educational purposes contributes a mere 0.00011% to all human-caused avian mortality (Winker *et al.* 1991).

Also, given our knowledge of songbird population dynamics, mortality induced by collecting is not additive, but rather compensatory (K. Winker, pers. comm.; see next section), meaning, the few individuals collected by scientists become part of the population that would have died through other means such as disease or starvation, carrying capacity is not altered, and annual mortality of the population is not affected, i.e. about the same number will exist at the next breeding season, when the animals collected are replaced by new recruits that would otherwise have not bred into the breeding population (Remsen 1995; K. Winker, pers. comm.). There is no evidence that scientific collections result in additive mortality in birds.

Should Rare Birds be Collected?

Remsen (1995) warned that collecting specimens could damage populations that are very small or those with poor recruitment rates, and wrote that modern scientists would object to collecting from these fragile populations. Does the new *Liocichla* represent such a population? The answer is: we don't really know because we do not have adequate population status data, and Athreya's decision to not collect one may even be justified given the unknown.

But many museum scientists would argue that Athreya squandered an opportunity for practicing sound science. Some of the systematists I interviewed or corresponded with said they *would* have collected a specimen had they been in his shoes. Kevin Winker, another accomplished museum ornithologist, wrote "Since Ramana Athreya first encountered the species in 1995, MANY have died, and collecting is not additive but rather compensatory mortality, so the natural

loss of individuals in this population has exceeded the impact that the collection of a type would have had.” Winker further added that in this case, with some creativity, we could have put forth the best conservation and best museum science by bringing several birds into captivity for a captive breeding program, and when the first individual died of old age, it could have been preserved and formed the basis for a new species description. He also suggested that by this time the new name could have been auctioned off to a high bidder and thus the species’ conservation (and, if I may add, the economy of the Bugun tribe that *Athreya* obviously cares about) placed on a firmer financial footing.

Townsend Peterson echoed similar sentiments. When I asked if he would have collected a specimen had he known the bird was very rare and that a collection could jeopardize the survival as a species, he replied “I sincerely doubt that these populations are so small. If your species really just had six individuals left, what is the probability that the describer saw all of them?” He added that he is almost certain that many more individuals exist, and for that reason would feel comfortable collecting one.

In an article criticizing the bush-shrike case, Peterson and Lanyon (1992) argued that, given what is known about the dynamics of songbird populations, “any songbird species represented by so few individuals, that a single individual represents a sizeable proportion of the breeding population, *will* be extinct in a very short span of time.” So what should the scientific world do if there is just one bird of a species left in the wild (or two or more of the same sex)? Wouldn’t it be better to collect a specimen, rather than for the species to vanish into thin air with no clear documentation of it having ever existed? Are we not better off having that mounted (albeit depressing) specimen of the extinct Great Auk (*Pinguinus impennis*) staring out of the glass case in that museum? Let posterity at least see in a museum what we have extinguished from the wild.

Why can’t some ‘Less Harmful’ Alternatives to Collecting be Explored?

Museum scientists maintain that there simply is no viable alternative to collecting. Remsen (1995) analysed in depth the various proposed alternatives, from examination of live birds in hand, to obtaining photographs (see above) and blood and tissue samples, and methodically highlighted the drawbacks of every one of them, drawbacks that can only be solved by the collection of a museum specimen. Even such perceived non-harmful measures such as mist-netting¹, bird-

ringing, and colour-banding (see Hagan and Reed 1988) are not as innocuous as they are touted to be. The annual mortality caused by ringing far exceeds that caused by scientific collecting (Remsen 1995). Handling can also cause birds to abandon the area (Poulin *et al.* 1994, as cited in Remsen 1995). As for the collection of molecular evidence, see the section on that topic elsewhere (below) in this essay.

Are museum scientists “blood-thirsty”?

So, are Townsend Peterson *et al.* so singularly focused on getting specimens that they don’t care for conservation? Are they ‘obsessively’ arguing for collecting to keep their jobs? Remsen (1995) addressed these issues. He and others say that museum work enhances knowledge and awareness, and that this directly or indirectly impacts positively on bird conservation. “Many influential conservationists, from Theodore Roosevelt to Theodore Parker, collected and continue to collect museum specimens” wrote Remsen, and he added that Parker used specimens in more than 65% of his technical papers. Most modern museum scientists, according to Remsen, are also conservationists in practice and spirit, and most feel that the killing of birds for museums is “necessary but distasteful”. Museum scientists are as interested in the living bird as non-museum scientists, and almost all pursue other avenues of inquiry pertaining to live birds like vocalizations and ecology. The tally of specimens ‘bagged’ is not an index to the caliber of a museum scientist (Remsen 1995), contrary to Beane (1991), who claimed that “ornithologists are measured by the number of birds they have collected”.

As discussed earlier, some museum scientists would have readily collected the new *Liocichla*, a deed that conservation organizations would not have readily advocated. Collar (1999) described the rather unusual circumstances behind the bush-shrike case (having been the one who recommended that the shrike be kept alive) wherein a conservation organization (he heads BirdLife International) was seemingly at odds with museum science. Reading Collar’s (1999, 2000, 2003) papers and extensive commentaries on the topic, I am convinced, as he was, that the way out of this apparent conflict is for museums and conservation organizations to work interactively and not become too territorial in their missions.

One of my Indian colleagues, a seasoned birdwatcher and conservationist, called this push for voucher specimens an ‘American thing’, and lamented that “the fact that the bird is pretty rare does not bother them.” He referred to the Banks

¹Townsend Peterson pointed out (by way of informal conversation) that one of the *Liocichla* pictures (Pic. 9) in Athreya’s (2006) paper depicted a bird with half-closed eyes – an apparent sign, he said, of fatigue or trauma. He hastened to clarify that he was not implying that the netters abused the bird. I added this footnote in relation to the point I raised about the perceived safety of bird netting.

et al. (1993) paper to support that assertion. But the fact is Banks' paper was endorsed by scientists from 18 countries² on both sides of the Atlantic. Another widely circulated statement summarizing the importance of scientific collecting was endorsed by 294 ornithologists from 61 countries, and only four ornithologists disagreed with the statement (Goodman and Lanyon 1994). For some excellent examples of conservation-oriented papers authored or co-authored by American museum ornithologists, see Remsen (1978), Remsen and Parker (1983), Osborne and Peterson (1984), Remsen *et al.* (1991), Peterson *et al.* (1993), Parker *et al.* (1993), Escalante-Pliego and Peterson (1994), Hernández-Baños *et al.* (1995), Remsen and Parker (1995), Johnson *et al.* (1998), Peterson and Navarro-Siguenza (1999), and Peterson and Robbins (1999). There is, and should be, no transatlantic divide between museum science and conservation.

Would molecular evidence not suffice?

I added this question, although it is not an issue with the current *Liocichla* case, because this question is increasingly asked in this era of DNA techniques. Hughes (1992a³), in a follow-up to the bush-shrike description, opined that in the case of new descriptions of species that are endangered, catch-and-release is the only ethical course to take. He added, "a DNA sample can potentially provide far more information about the relatedness of any organic species than a museum specimen could ever do." Peterson and Lanyon (1992) interpreted that comment as a call against museum collection (which Hughes [1992b] denied in his rebuttal) and pointed out that the bird was not described on the basis of DNA comparisons only, and that if the bird had not been distinct in colour and morphology, it would never even have been noticed. They pointed out that DNA studies cannot provide the suite of information that can be gleaned only *via* an examination of museum specimens. "The vast majority of the 9000+ currently recognized bird species is supported by a museum study skin", they wrote, and then ask rhetorically, "after over 90% of the world's bird species have been described, is it logical to select an entirely new form of documentation?" (Peterson and Lanyon 1992). For some specific Old World examples to illustrate why blood alone is not enough to decode taxonomic puzzles, see Bates *et al.* (2004).

My perusal of the literature convinces me that molecules and biochemicals complement, rather than replace, voucher

specimens. Winker (1996), in an excellent and widely-cited essay entitled 'The Crumbling Infrastructure of Biodiversity', wrote "Because ornithology has a skin-based taxonomy, the preservation of skins as vouchers is mandatory – and is simply good field science." Molecular data, he said, are the strongest when they accompany phenotypic evidence, and cited several key articles. Remsen (1995) also cited several papers that demonstrate that genotypic and phenotypic evidence when used in tandem can offer dramatic new insights into avian evolution. Therefore, to again quote Winker (1996), "Molecules give added scope, but will never serve as a replacement for a taxonomy based on two centuries of careful examination of phenotypes."

Should bird journals accept new species descriptions without proper voucher specimens?

Banks *et al.* (1993) strongly recommended that editors of bird journals or 'other literature concerning birds' summarily reject and refuse to publish papers that attempt to describe new taxa without a proper specimen deposited in a museum. In an interview published shortly after the publication of the discovery, Ramana Athreya is quoted to have said "With today's modern technology, we could gather all the information we needed to confirm it as a new species. We took feathers and photographs, and recorded the bird's song." Many systematists would argue that full confirmation and the species' exact taxonomic status is possible only by a methodical examination of museum skins of various individuals of this and all related species in a museum setting. In light of all other comments he made on this subject (covered in this essay), Winker told me that no bird journal should accept a description of a new species without a type specimen. Peterson was more circumspect, saying, "The Code has clear guidelines about whether a publication qualifies, and I would suspect that *Indian Birds* does qualify." He said that Athreya should have written an article informing and documenting the discovery of the species, but should not have gone to the extent of formally describing it without a proper type specimen. He added: "Reviewers for a major ornithological journal... would likely have urged the author to collect a specimen as clear documentation of the species."

There is a precedent to informally reporting a putative new species. King *et al.* (1999) reported "An undescribed *Muscicapa* flycatcher" from Sulawesi, Indonesia, based solely

²Ironically, one of the signatories of the Banks *et al.* (1993) paper was R. Schodde, who authored the new Malurine Wren description without a voucher specimen (Schodde and Weatherly 1983). Schodde now chairs the Standing Committee on Ornithological Nomenclature of the I.O.C. (R. Banks, pers. comm.).

³Hughes, apparently lacking the eye for detail that taxonomists are known for, misspelled the generic name of the Bulo Burti Bush-shrike as "*Lanarius*" throughout the document.

on field observations, and wrote "A formal description of the species is not possible with this limited information." They added that they wrote the note "to call attention to its existence and to facilitate further study."

CONCLUSIONS

I hope this essay enhances awareness of the science and sentiments behind the issue. The best end to the whole episode would, of course, be the obtaining of a proper specimen without jeopardizing the species' overall status. I am an ardent conservationist, but I must admit I was swayed by the arguments in favour of collecting a specimen right away. Given that Bugun Liocichlas have been around rather predictably in that same sanctuary for more than a decade, and given that it is a protected area with no immediate threat of habitat destruction, I am confident that the collecting of a specimen will have no long-term negative effect on the local population. But this is just my opinion based on perusal of literature and interaction with some experts 10,000 km away. The decision makers are those on ground zero and I wish them the best as they collect status information and other pertinent data, and as they negotiate bureaucratic problems (I am sure getting a collecting permit would not be easy). I also urge them to make their best decision based on sound science and conservation.

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